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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/791,751

03/04/2004

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01/10/2005

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EXAMINER

CHU, CHRIS C

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/791,751

Applicant(s)

TOMITA ET AL.

Examiner

Chris C. Chu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 5 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1 - 5 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/4/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

1. Claim 3 is objected to because of the following informalities: On line 5, "is" should be --are--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "minimum" in claim 5 is a relative term which renders the claim indefinite. The term "minimum" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 2 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Hagihara (JP 2001-168093 and U.S. Pat. No. 6,570,243: The Japanese publication is the basis for the rejection under 102(b). For ease of understanding, the U.S. reference will be cited as needed.).

Regarding claim 1, Hagihara discloses in e.g., Fig. 1(e) and Fig. 2 an interconnecting structure comprising:

- first wirings (the first wiring layer in the inner pattern region; column 6, lines 33 – 35) on a substrate (1);
- a low-k dielectric film (SOG film 5; column 6, line 42) on the first wirings (column 6, lines 38 – 49), the low-k dielectric film having a dielectric constant not exceeding 3 (k is approximately 2.3 – see column 1, lines 29 – 32 of Tsuji et al. U.S. Pat. No. 6,818,570);
- vias (the via holes at elements forming region; column 6, lines 53 – 56) in the low-k dielectric film and connected to the first wiring;
- second wirings (the second wiring layer in the inner pattern region; column 7, lines 1 – 4) on the vias and connected to the vias; and
- dummy vias (7 in Fig. 1(C); column 5, lines 55 – 57) on the periphery of an isolated via of the vias.

Regarding claim 2, Hagihara discloses in e.g., Fig. 1(e) and Fig. 2 further comprising a cap film (9) on the low-k dielectric film, wherein the second wirings (8) are in the cap film and the low-k dielectric film (at the top view of the Fig. 1(e)).

Regarding claim 4, Hagihara discloses in e.g., Fig. 1(e) and Fig. 2 the dummy vias having a slit shape (see Fig. 2 and column 5, lines 19 – 25).

6. Claims 1, 2, 4 and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by Hasegawa et al. (U. S. Pat. No. 6,452,274).

Regarding claim 1, Hasegawa et al. discloses in e.g., Fig. 7F and column 20, line 45 – column 21, line 32 an interconnecting structure comprising:

- first wirings (71; column 19, lines 63) on a substrate (62);
- a low-k dielectric film (78; column 20, line 60) on the first wirings, the low-k dielectric film having a dielectric constant not exceeding 3 (column 5, lines 60 – 63 and column 9, lines 1 – 25);
- vias (76) in the low-k dielectric film and connected to the first wiring;
- second wirings (81; column 21, line 13) on the vias and connected to the vias;
- and
- dummy vias (77) on the periphery of an isolated via of the vias.

Regarding claim 2, Hasegawa et al. discloses in e.g., Fig. 7F and column 21, lines 22 – 32 further comprising a cap film (the insulating layer in a third multilayer interconnection structure that is formed on top of the layer 78 and covering the elements 81 and 82; column 21, lines 30 – 32) on the low-k dielectric film, wherein the second wirings (81 and 82) are in the cap film and the low-k dielectric film.

Regarding claim 4, Hasegawa et al. shows in e.g., Fig. 7F the length of the dummy vias having a long narrow shape in a layer (e.g., vias 27 in Fig.). Thus, the dummy vias of Hasegawa et al. read as a slit shape.

Regarding claim 5, Hasegawa et al. shows in e.g., Fig. 7F the dummy vias (77) having an approximate dimension of a diameter that is similar as the diameter of non-dummy vias (76). Thus, Hasegawa et al. discloses in e.g., Fig. 7F the dummy vias having a dimension 1 times a "minimum" dimension of the vias.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hasegawa et al. in view of Sugiyama et al. (U. S. Pat. No. 6,486,558).

Regarding claim 3, Hasegawa et al. discloses in e.g., Fig. 7F further comprising:

- first dummy wirings (72; column 19, line 63) on the periphery of the first wirings (71); and
- second dummy wirings (82; column 21, lines 13 – 14) on the periphery of the second wirings (81), wherein the dummy vias (77) are connected to the first and second dummy wirings (see Fig. 7F).

However, Hasegawa et al. does not disclose one of the first and second dummy wirings connected to the dummy vias being connected to ground potential. Sugiyama et

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al. teaches in e.g., Fig. 7 one of a first (102 in the layer 88) and second (102 in the layer 90) dummy wirings connected to dummy vias (106) being connected to ground potential (column 7, lines 11 – 13). It would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Hasegawa et al. by forming the ground potential of Sugiyama et al. under the dummy wirings into the structure of Hasegawa et al. as taught by Sugiyama et al. The ordinary artisan would have been motivated to modify Hasegawa et al. in the manner described above for at least the purpose of electrically connecting the dummy wirings to the ground terminal of the substrate to stabilize capacitance (column 7, lines 65 – 67).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Higashide et al., Umematsu et al., Dosaka et al. and Kim et al. disclose dummy vias and wirings.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is 571-272-1724. The examiner can normally be reached on 11:30 - 8:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 517-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chris C. Chu
Examiner
Art Unit 2815

c.c.
Wednesday, December 22, 2004


GEORGE ECKERT
PRIMARY EXAMINER